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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,414	01/22/2002	Chang-Won Choi	8045-33 (PX1441-US/SSD)	5089

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F. CHAU & ASSOCIATES, LLC
130 WOODBURY ROAD
WOODBURY, NY 11797

EXAMINER	
KACKAR, RAM N	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/054,414	CHOI ET AL.	
	Examiner	Art Unit	
	Ram N Kackar	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/18/2004 has been entered.

Claim Rejections - 35 USC § 103

2 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3 Claims1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ke et al (US 6284093).

Ke et al disclose a slant angle in an embodiment being 55 degrees (Col 18 lines 17-23) and an insulated ring at a surrounding portion of the chuck body (Fig 2-28) and teach that the slant angle (Col 11 lines 3-8) and spacing (Col 11 lines 33-35) produce a focusing effect which modifies the ion flux distribution and therefore must be determined empirically. Ke et al also teach that the RF coupling is inversely proportional to the electrical resistivity of the silicon ring (Col 13 line 44-45). Ke et al teach that it may be desirable to experiment with dielectric shields

and protective rings in order to optimize size and shape for uniform processing for a given fabrication process (Col 10 lines 19-32).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to optimize the, slant angle and spacing of the edge ring to obtain consistent and uniform plasma sheath for uniform processing. This type of optimization has been held obvious.

4 Claims1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art (AAPR) in view of Kholodenko et al (US 5942039) and Ke et al (US 6284093).

AAPR (Fig 2) discloses an edge ring with a slanted step portion (Fig 2) spaces from the wafer and surrounding insulator ring but does not disclose the slanting angle or the spacing.

Kholodenko et al disclose a focus ring with a slanted surface and teach that this surface provides plasma focusing and disclose its angle to vertical to be 10-75 degrees (Col 3 lines 55-62).

Ke et al disclose a slant angle in an embodiment being 55 degrees (Col 18 lines 17-23) and teach that the slant angle (Col 11 lines 3-8) and spacing produce a focusing effect which modifies the ion flux distribution and spacing must be determined empirically (Col 11 lines 33-35).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to optimize the slant angle and spacing for best performance as regards through put and uniformity.

5 Claims1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art (AAPR) in view of Ye et al (US 5891348) and Ke et al (US 6284093).

AAPR (Fig 2) discloses an edge ring with a slanted step portion (Fig 2) spaces from the wafer and surrounding insulator ring but does not disclose the slanting angle or the spacing.

Ye et al disclose a focus ring with a slanted surface and teach that this surface smoothly directs the process gas and plasma to the substrate and disclose its angle to vertical to be 10-75 degrees (Col 3 lines 55-62).

Ke et al disclose a slant angle in an embodiment being 55 degrees (Col 18 lines 17-23) and teach that the slant angle (Col 11 lines 3-8) and spacing produce a focusing effect which modifies the ion flux distribution and spacing must be determined empirically (Col 11 lines 33-35).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to optimize the slant angle and spacing for best performance as regards through put and uniformity.

Response to Arguments

Applicant's arguments filed 11/18/2004 have been fully considered but they are not persuasive.

Applicant argues that Ke discloses an angle of 55 degrees but not more than 55 degrees. This point is not persuasive since there is no clear separation between the disclosed range and the claimed range.

Applicant argues that Ke actually teaches against the claimed range of more than 55 to about 80 degrees.

This is not correct in view of the teaching of Ke that the size and shape should be optimized for a particular process (Col 10 lines 19-32). The disclosed range of 20-55 degrees is in reference to a specific example of disclosed invention.

Applicant argues that spacing S in Ke et al is not same as the claimed spacing.

Since spacing S in Ke is measured from the wafer perimeter to the elevated portion (Col 10 lines 3-5), it is at least true that they both refer to the same variable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RK

Ram Kackar AU 1763.